

COMPETENCY PROFILE:

INSTRUMENTATION TECHNICIAN

ROLE OVERVIEW

Instrumentation technicians ensure the proper functioning of automated manufacturing equipment. They work closely with instrument engineers to develop control equipment, such as valves, relays, and regulators. As such, they work with various pneumatic, electronic, and microcomputer devices used to measure and control pressure, flow, temperature, level, motion, force, and chemical composition.

They are the primary people directly responsible for building, testing, monitoring, and maintaining equipment. Instrumentation technicians monitor variables like flow, temperature, pressure, and more to ensure equipment and systems function correctly, safely, and at peak performance. Most work for manufacturing plants. Working conditions may vary drastically from one position to another.

ALSO KNOWN AS:

- Instrumentation Service Technician
- Instrumentation and Control Technician
- Instrument and Control Technician
- Valve technician
- Instrumentation Engineering Technician
- Control Systems Technologist
- Control and Instrumentation Technologist
- Instrument Technician
- Automation Technician
- Electrical Maintenance Technician

NATIONAL OCCUPATIONAL CLASSIFICATION:

- 22312 – Industrial instrument technicians and mechanics

EDUCATION AND EXPERIENCE

- Journeyperson or Red Seal certification is essential for becoming an instrumentation technician. It provides a recognized standard across Canada and requires passing an exam to demonstrate field knowledge and skills.
- A diploma or certification in instrumentation and control is necessary for specialized training in device design, installation, maintenance, and repair. This training is offered by vocational schools and community colleges and covers electronics, process control, automation, and programming.
- Apprenticeship Program Completion: Combines practical on-the-job training with classroom instruction under expert guidance. Sponsored by employers, associations, or unions, it's vital for gaining hands-on experience.
- Provincial associations set instrumentation technician profession standards, dictating training, certification, and practice requirements. Technicians must comply with these, possibly including additional training and exams.
- Rapid technological advancements make education and professional development crucial. Technicians should continuously update their skills and knowledge through further education and certifications.

TECHNICAL



Data Management

Implements Standard Operating Procedures (SOPs) for data collection, capturing, analysis, and access to facilitate management's decision-making.

- Review production reports/shift logs to aid in efficient operations.
- Interprets work orders, assembly drawings, blueprints, circuit diagrams, and schematics to understand testing and maintenance protocols for instruments that measure and control variables such as flow, level, pressure, temperature, and chemical composition.
- Creates/updates instrument inventory (name, serial number, location, manufacturer details, etc.) to manage the equipment effectively.
- Ensures that all data relevant to the instrument is captured, entered, controlled, validated, and documented according to SOPs to ensure the instrument is in good working condition.

Electrical Systems

Inspects electrical systems and components to identify faults and perform diagnostics to establish root causes and remedy faults.

- Applies appropriate processes and procedures to maintain electrical systems and components to ensure systems meet quality assurance and operating specifications.
- Collaborates with other technical staff to analyze electrical and electronic circuits to identify appropriate pathways and solutions.
- Applies appropriate methods and techniques to dismantle, remedy, and reassemble electrical systems or components.

- Makes appropriate checks and adjustments to electrical equipment to ensure components are correctly replaced, positioned, or aligned.
 - Configures electrical systems and equipment by operating specifications to ensure optimal system performance.
 - Tests new electrical system components to ensure systems function as expected before installation.
 - Records defects and reports findings of diagnostics work to communicate and determine appropriate course of action.
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Installation

Installs and programs control and measurement instruments on existing and new equipment to improve productivity within the company as per manufacturer and company requirements.

- Checks electrical requirements, physical space needed, etc., and identifies out-of-the-ordinary conditions to ensure proper instrument installation.
 - Identifies installation, calibration, and maintenance requirements (e.g., tools, spare parts to stock, etc.) to meet supplier and company specifications.
 - Advises team members about the installation timing to minimize interference with production during installation.
 - Identifies and collaborates with additional stakeholders and personnel to ensure a smooth and safe installation (including pre-and post-installation requirements).
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Instrument Handling

Carries out repairs per manufacturer specifications in case of instrument and/or system component failure to minimize downtime and maintain productivity.

- Inspect the instrument and use appropriate tools to make sure the instrument meets all design parameters and specifications.
 - Identifies the source of failure to enable effective corrective action.
 - Checks all tasks that have been affected by the failure once the instrument is operational again.
 - Troubleshoots, repairs, and, if necessary, retire the instrument, considering any potential hazards and following all safety disposal procedures.
 - Contact the appropriate authority if the instrument's failure, in part or whole, indicates significant operational issues.
 - Ensures that all data relevant to the instrument's or part's failure is documented and reported to stakeholders accordingly.
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Mechanical Maintenance and Repair

Performs routine and non-routine equipment maintenance to maintain safe and efficient operations and lessen the likelihood of instrument breakdowns, accidents, and the associated costs.

- Documents maintenance to record equipment service to plan future service schedules.
- Performs preventative and corrective maintenance according to established protocols to ensure equipment and systems function efficiently.
- Resets equipment following repair or service to test equipment to ensure equipment functions as expected.

- Reads and interprets equipment manuals to learn new systems and troubleshoot and repair different pieces of equipment.
 - Uses diagnostic tools, techniques, and procedures to identify the root cause of faults and perform corrective maintenance according to best practices.
 - Records defects and reports findings of diagnostics work to communicate and determine appropriate course of action.
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Mechanical Systems

Operates, inspects, configures, and installs mechanical systems (including process systems) to ensure they work efficiently.

- Uses pneumatic, electrical, and electronic testing devices to inspect and test instrument and system operation and diagnose faults.
 - Reads and understands manufacturers' manuals to calibrate and maintain components and instruments according to the manufacturer's specifications.
 - Tests new mechanical system components to ensure systems function as expected before installation.
 - Takes appropriate precautions to prevent leaks, spills, contamination, or other hazards to minimize risks and environmental contamination while repairing equipment.
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Risk Assessment

Identifies and evaluates potential risks associated with project tasks and develops effective risk management strategies and policies to mitigate those risks and ensure safety.

- Assists in risk categorization (technical, operational, logistics, environmental, or safety) to determine the areas most exposed to risk effects.
- Identifies risk factors and organizational vulnerabilities to inform decision-makers of potential project risks to support the development of programs and policies to mitigate risk.
- Identifies and assists in documenting hazards during exercises to communicate potential risks and evaluate precautions that can be taken to prevent such harm.
- Take appropriate precautions around hazardous areas to mitigate potential unforeseen events.



Attention to Detail

Review completed work by monitoring and checking information, organizing tasks and resources efficiently, and assessing all areas involved in achieving an objective.

- Takes care when reading manufacturers' manuals to ensure that none of the details of different systems are missed.
 - Accurately completes documents and report logs to ensure safe and efficient operations.
 - Catches and corrects errors or omissions, where applicable, to ensure efficiency and safety.
 - Follows processes as outlined in standard operating procedures when completing routine tasks.
 - Documents incidents or anomalies to monitor issues and correct future actions.
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Communication

Positively directs outcomes by delivering communication that results in a better understanding of goals and objectives, captures interest, and gains support for immediate action.

- Communicate any identified faults and the progress of the repair to the rest of the team and supervisors as necessary to ensure that the team is aware of recurring issues.
 - Ask questions when assigned unfamiliar tasks to ensure understanding and accuracy.
 - Communicate with other team members to share information and resources to improve operations and workplace tasks.
 - Verbally conveys complex technical information accurately, clearly, and in plain language to communicate technical operations.
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Problem-Solving

Identifies problems and uses logic, judgment, and evidence to evaluate alternative scenarios and recommend solutions to achieve a desired goal.

- Approaches mechanical/electronic/pneumatic problems with a balance of logic and creativity to develop innovative solutions.
- Seeks advice from senior decision-makers or technical experts when confronted with unfamiliar issues to ensure effective solutions.
- Evaluate time commitments and resource constraints to balance overlapping projects to ensure adequate time management.
- Applies logical and iterative analysis to evaluate events and outcomes.

Teamwork

Actively participates in working with and helping others to accomplish a common objective.

- Supports the decisions of senior employees and works to achieve the specified outcome.
- Recommends improvements or solutions to supervisors to improve operational efficiency.
- Participates in training activities and incorporates acquired skills and knowledge to improve operational performance
- Collaborates with other technical staff to ensure common understanding and devise solutions to ensure the proper functioning of mechanical instruments.
- Listens to constructive feedback and incorporates suggestions to achieve a collective objective.



Health and Safety Procedures

Adheres to and advocates specific workplace safe operating procedures and occupational health and safety requirements within a defined jurisdiction to ensure the health and safety of others.

- Uses any necessary personal protective equipment (PPE) to prevent personal injury while at work.
- Maintains PPE to ensure it is properly functioning and replaces it with new PPE.
- Understands emergency procedures in total and is prepared to follow them to mitigate harm in the case of an incident.
- Uses industry-standard climbing, lifting, rigging, and hoisting practices to prevent incidents while working at height.
- Demonstrates the safe use of hand, power, and specialty tools and equipment to ensure work is completed safely and efficiently.
- Identifies hazards while at work and protects against risks to increase workplace safety.

This profile is a living document. If you have any feedback or would like to help us improve the profile, please reach out to research@eco.ca.